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EXAMINER	
WILLHITE, TYLER C	

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2189	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/674,081	NEW ET AL.	
	Examiner	Art Unit	
	Tyler Willhite	2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-13,15,16 and 18-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-13,15,16 and 18-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 June 2007* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This office action is in response to an amendment and accompanying arguments filed on 13 June 2007. Claims 1-4, 6-13, 15, 16, and 19-25 are amended. Claims 5, 14, and 17 are cancelled. Claims 1-4, 6-13, 15, 16, and 18-25 are pending. Any rejections from a prior office action not repeated below should be considered withdrawn. The arguments are considered following the statement of the rejections based on prior art.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the RAID system and RAID controller as recited in claims 9 and 18-25 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings were not amended by applicant to include the RAID system and RAID controller as recited in claims 9 and 18-25. Applicant's argument that an illustration of the claimed RAID system would be identical to figure 1 except that the "HDD controller" would be a "RAID controller" is not found to be persuasive as the RAID system of claim 18 includes features not included in figure 1 such as multiple disk drives, a controller for each disk drive, and a RAID controller separate from the controllers for each disk drive. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark

Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claim 18 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 9 of copending Application No. 10/674093 (hereafter '093). Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending claims anticipate the instant claims. A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness-type

double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness-type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

3. Claim 18 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 9 of copending Application No. '093 in view of Rosenblum et al. ("The Design and Implementation of a Log-Structured File System", 1991, hereafter Rosenblum) and Holland et al. (US Pat. 5,367,669, hereafter Holland).

This is a provisional obviousness-type double patenting rejection.

4. Claim 9 of '093 shows all the limitations of claim 18 of the instant application except a log-structure file-system for storing files and a RAID system with a RAID controller coupled to each disk.

Rosenblum shows a log-structured file system for storing files (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the log-structured file system of Rosenblum in the disk storage system of '093 in order to achieve faster file writing and crash

recovery (page 1, left hand column, lines 4-7 and page 9, right hand column, lines 14-30).

Holland shows a RAID system including a RAID means for controlling (RAID controller **8**) (figure 1 and column 2, lines 66-68 through column 3, lines 1-6) and a plurality of hard disk drives (hard disk drive array) with the RAID controller being coupled to each of the disk drives (figure 1 and column 2, lines 43-51).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a RAID means for controlling and RAID system as taught by Holland using the disk system taught by the combination of claim 9 of '093 and Rosenblum in the RAID configuration in order to enable recovery of information stored on a disk in the event of a disk drive failure (column 1, lines 29-31).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (US PGPub. 2002/0071198, hereafter Liu) in view of Rosenblum in view of Asano et al. (US PGPub 2003/0147167, hereafter Asano).

8. Regarding claim 1, Liu shows a hard disk drive (HDD) comprising:

at least one rotatable disk (page 3, right hand column, lines 26-28);

at least one write element (transducer) configured for writing data to the disk (page 3, right hand column, lines 28-30) in isolated tracks (page 6, right hand column, lines 8-13) and in bands, wherein at least two tracks establish a band (plurality of adjacent tracks) (page 6, left hand column, lines 35-52); and

at least one HDD controller controlling the write element (page 7, paragraph 73), wherein segments of data (grouping of data written sequentially) corresponds to a respective band or respective isolated track (page 6, paragraph 67 and paragraph 70) and an embedded file system is used in reading and writing data (page 6, paragraph 69).

However, Liu does not disclose the file system being a log-structured file system with segments.

Rosenblum shows a log-structured file system (page 3, left hand column, lines 36-41 through right hand column, lines 1-2) wherein the file system defines segments for writing groupings of sequential data (page 4, right hand column, lines 14-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the log-structured file system of Rosenblum in the disk storage system of Liu such that each segment corresponds to an isolated track or a band of tracks in order to achieve faster file writing and crash recovery (page 1, left hand column, lines 4-7 and page 9, right hand column, lines 14-30).

However, the combination of Liu and Rosenblum does not show the use of error correction code.

Asano discloses, in a magnetic disk storage system wherein data is written one sector at a time (page 3, paragraph 28), using an error correction code (ECC) block size larger than a physical sector size of the disk, a cumulative ECC parity state between partial writes of an ECC block being retained (page 8, paragraphs 107 and 108).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the ECC structure and operations of Asano in the disk system of the combination of Liu and Rosenblum such that the log-structured file system uses the error correction code in order to provide projection against burst errors and random errors without incurring the delays of read-modify-write operations when sequentially writing large amounts of data (Asano, page 8, paragraph 107).

9. Regarding claim 2, the combination of Liu, Rosenblum, and Asano teaches all the limitations of claim 1 as shown above, and Liu shows that at least some bands include at least three contiguous tracks (figure 13 and paragraph 68).

10. Regarding claim 4, the combination of Liu, Rosenblum, and Asano teaches all the limitations of claim 1 as shown above, and Liu discloses that the tracks within a band (data block) are shingled (figure 13 and page 6, paragraph 68).

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Asano as applied to claim 1 above, and further in view of Payne et al. (US Pat. 6,212,047, hereafter Payne).

12. Regarding claim 3, the combination of Liu, Rosenblum, and Asano teaches all the limitations of claim 1 as shown above but does not disclose the write element being configured for perpendicular recording.

Payne shows a magnetic disk system wherein the write element is configured for perpendicular recording (column 3, lines 45-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the configuration of the write element for perpendicular recording as taught by Payne in the disk system of the combination of Liu, Rosenblum, and Asano in order to achieve high density storage with good stability on magnetic disk storage (Payne, column 2, lines 3-11).

13. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Asano as applied to claim 1 above, and further in view of Ono et al. (US Pat. 5,872,905, hereafter Ono).

14. Regarding claim 6, the combination of Liu, Rosenblum, and Asano teaches all the limitations of claim 1 as shown above, and Liu shows shingled track writing (page 6,

left hand column, lines 35-45). However, the combination of Liu, Rosenblum, and Asano does not disclose using a virtual address table when writing to the disk.

Ono teaches using a virtual address table (translation table) for accessing a magnetic disk wherein a virtual sector is assigned a replacement sector when a sector originally mapped to the virtual sector is corrupted (column 17, lines 34-44).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the virtual address table of Ono in the disk writing procedure of the combination of Liu, Rosenblum, and Asano in order to maintain the integrity of the data being stored on a magnetic disk storage apparatus without complicating the logic of the devices accessing the storage apparatus (Ono, column 17, lines 41-50).

15. Regarding claim 7, the combination of Liu, Rosenblum, Asano, and Ono teaches all the limitations of claim 6 as shown above, and Ono shows that the VAT (translation table) maps virtual sector locations to actual sector locations (column 17, lines 26-40).

16. Regarding claim 8, the combination of Liu, Rosenblum, Asano, and Ono teaches all the limitations of claim 6 as shown above, and Ono discloses that the VAT is stored in a location on the disk (column 17, lines 34-40). Furthermore, Liu shows that the storage locations on the disk consist of a region with non-overlapping tracks where random access writes can be performed, and a region with shingled written bands (page 6, paragraph 67). Additionally, Rosenblum shows that storage operations use a log structured approach (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, Asano, and Ono as applied to claim 6 above, and further in view of Holland et al.

18. Regarding claim 9, the combination of Liu, Rosenblum, Asano, and Ono teaches all the limitations of claim 6 as shown above, and remapping sectors as required by an access to the disk (Ono, column 17, lines 34-44) wherein accessing the disk includes shingled track writing (Liu, page 6, left hand column, lines 35-45). However, the combation of Liu, Rosenblum, Asano, and Ono does not teach the hard disk being part of a RAID system.

Holland shows a RAID system including a RAID controller (figure 1 and column 2, lines 66-68 through column 3, lines 1-6) wherein the RAID controller (I/O Process Manager software run on RAID controller) performs the logical to physical address translation for accesses to a hard disk (column 4, lines 57-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a RAID controller and system as taught by Holland using the disk system taught by the combination of Liu, Rosenblum, Asano, and Ono in the RAID configuration in order to enable recovery of information stored on a disk in the event of a disk drive failure (column 1, lines 29-31).

19. Claims 10, 11, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Rosenblum and Ono.

20. Regarding claim 10, Liu shows a hard disk drive (HDD) comprising:

disk means for storing data (page 3, right hand column, lines 26-28);

means for writing data to the disk (transducer) (page 3, right hand column, lines 28-30) in tracks (page 6, right hand column, lines 8-13) and in bands, wherein at least two tracks establish a band (plurality of adjacent tracks) (page 6, left hand column, lines 35-52) and wherein at least some bands are shingled (page 6, paragraph 68); and

means for controlling the means for writing (page 7, paragraph 73), wherein an embedded file system is used in reading and writing data (page 6, paragraph 69).

Liu also shows shingled track writing (page 6, left hand column, lines 35-45).

However, Liu does not disclose the file system being a log-structured file system.

Rosenblum shows the use of a log-structured file system for recording sequential data (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the log-structured file system of Rosenblum in the disk storage system of Liu in order to achieve faster file writing and crash recovery (Rosenblum, page 1, left hand column, lines 4-7 and page 9, right hand column, lines 14-30).

However, the combination of Liu and Rosenblum does not disclose using a virtual address table when writing to the disk.

Ono teaches using a virtual address table (translation table) for accessing a magnetic disk wherein a virtual sector is assigned a replacement sector (remapping) when a sector originally mapped to the virtual sector is corrupted (column 17, lines 34-44).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the virtual address table of Ono in the disk writing procedure of the combination of Liu and Rosenblum in order to maintain the integrity of the data being stored on a magnetic disk storage apparatus without complicating the logic of the devices accessing the storage apparatus (Ono, column 17, lines 41-50).

21. Regarding claim 11, the combination of Liu, Rosenblum, and Ono teaches all the limitations of claim 10 as shown above, and Liu shows that at least some bands include at least three contiguous tracks (figure 13 and paragraph 68).

22. Regarding claim 15, the combination of Liu, Rosenblum, and Ono teaches all the limitations of claim 10 as shown above, and Ono shows that the VAT (translation table) maps virtual sector locations to actual sector locations (column 17, lines 26-40).

23. Regarding claim 16, the combination of Liu, Rosenblum, and Ono teaches all the limitations of claim 10 as shown above, and Ono discloses that the VAT is stored in a location on the disk (column 17, lines 34-40). Furthermore, Liu shows that the storage locations on the disk consist of a region with non-overlapping tracks where random access writes can be performed, and a region with shingled written bands (page 6, paragraph 67). Additionally, Rosenblum shows that storage operations use a log structured approach (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

24. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Ono as applied to claim 10 above, and further in view of Payne.

25. Regarding claim 12, the combination of Liu, Rosenblum, and Ono teaches all the limitations of claim 10 as shown above but does not disclose the means for writing being configured for perpendicular recording.

Payne shows a magnetic disk system wherein the means for writing is configured for perpendicular recording (column 3, lines 45-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the configuration of the means for writing for perpendicular recording as taught by Payne in the disk system of the combination of Liu, Rosenblum, and Ono in order to achieve high density storage with good stability on magnetic disk storage (Payne, column 2, lines 3-11).

26. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Ono as applied to claim 10 above, and further in view of Asano.

27. Regarding claim 13, the combination of Liu, Rosenblum, and Ono teaches all the limitations of claim 10 as shown above but does not show the use of error correction code.

Asano discloses, in a magnetic disk storage system wherein data is written one sector at a time (page 3, paragraph 28), using an error correction code (ECC) block size

larger than a physical sector size of the disk, a cumulative ECC parity state between partial writes of an ECC block being retained (page 8, paragraphs 107 and 108).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the ECC structure and operations of Asano in the disk system of the combination of Liu, Rosenblum, and Ono such that the log means uses the error correction code in order to provide projection against burst errors and random errors without incurring the delays of read-modify-write operations when sequentially writing large amounts of data (Asano, page 8, paragraph 107).

28. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Rosenblum and Holland.

29. Regarding claim 18, Liu shows a hard disk drive comprising:

at least one storage disk (page 3, right hand column, lines 26-28);

at least one disk controller controlling reading data from and writing data to the disk (page 7, paragraph 73), wherein the drive controller writes data in shingled bands (data groups) (page 6, paragraph 68) and an embedded file system is used in reading and writing data (page 6, paragraph 69).

However, Liu does not disclose the file system being a log-structured file system.

Rosenblum shows a log-structured file system (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the log-structured file system of Rosenblum in the disk storage system of Liu in order to achieve faster file writing and crash

recovery (page 1, left hand column, lines 4-7 and page 9, right hand column, lines 14-30).

However, the combination of Liu and Rosenblum does not show a RAID system.

Holland shows a RAID system including a RAID means for controlling (RAID controller **8**) (figure 1 and column 2, lines 66-68 through column 3, lines 1-6) and a plurality of hard disk drives (hard disk drive array) with the RAID controller being coupled to each of the disk drives (figure 1 and column 2, lines 43-51) wherein the RAID means for controlling (I/O Process Manager software run on RAID controller) performs the logical to physical address translation for accesses to a hard disk (column 4, lines 57-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a RAID means for controlling and RAID system as taught by Holland using the disk system taught by the combination of Liu and Rosenblum in the RAID configuration in order to enable recovery of information stored on a disk in the event of a disk drive failure (column 1, lines 29-31).

30. Regarding claim 19, the combination of Liu, Rosenblum, and Holland teaches all the limitations of claim 18 as shown above, and Liu shows that at least some bands include at least three contiguous tracks (figure 13 and paragraph 68).

31. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Holland as applied to claim 19 above, and further in view of Payne.

32. Regarding claim 20, the combination of Liu, Rosenblum, and Holland teaches all the limitations of claim 19 as shown above but does not disclose the disk drives being configured for perpendicular recording.

Payne shows a magnetic disk system wherein a disk drive is configured for perpendicular recording (column 3, lines 45-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the configuration of disk drives for perpendicular recording as taught by Payne in the RAID system of the combination of Liu, Rosenblum, and Holland in order to achieve high density storage with good stability on magnetic disk storage (Payne, column 2, lines 3-11).

33. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Holland as applied to claim 19 above, and further in view of Asano et al. (US PGPub 2003/0147167, hereafter Asano).

34. Regarding claim 21, the combination of Liu, Rosenblum, and Holland teaches all the limitations of claim 19 as shown above but does not show the use of error correction code.

Asano discloses, in a magnetic disk storage system wherein data is written one sector at a time (page 3, paragraph 28), using an error correction code (ECC) block size larger than a physical sector size of the disk, a cumulative ECC parity state between partial writes of an ECC block being retained (page 8, paragraphs 107 and 108).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the ECC structure and operations of Asano

in the disk system of the combination of Liu, Rosenblum, and Holland such that the log-structured file system uses the error correction code in order to provide projection against burst errors and random errors without incurring the delays of read-modify-write operations when sequentially writing large amounts of data (Asano, page 8, paragraph 107).

35. Claims 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liu, Rosenblum, and Holland as applied to claim 19 above, and further in view of Ono.

36. Regarding claim 22, the combination of Liu, Rosenblum, and Holland teaches all the limitations of claim 19 as shown above, and Liu shows shingled track writing (page 6, left hand column, lines 35-45). However, the combination of Liu, Rosenblum, and Holland does not disclose using a virtual address table when writing to the disk.

Ono teaches using a virtual address table (translation table) for accessing a magnetic disk wherein a virtual sector is assigned a replacement sector when a sector originally mapped to the virtual sector is corrupted (column 17, lines 34-44).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the virtual address table of Ono in the disk writing procedure of the combination of Liu, Rosenblum, and Holland in order to maintain the integrity of the data being stored on a magnetic disk storage apparatus without complicating the logic of the devices accessing the storage apparatus (Ono, column 17, lines 41-50).

37. Regarding claim 23, the combination of Liu, Rosenblum, Holland, and Ono teaches all the limitations of claim 22 as shown above, and Ono shows that the VAT (translation table) maps virtual sector locations to actual sector locations (column 17, lines 26-40).

38. Regarding claim 24, the combination of Liu, Rosenblum, Holland, and Ono teaches all the limitations of claim 22 as shown above, and Ono discloses that the VAT is stored in a location on the disk (column 17, lines 34-40). Furthermore, Liu shows that the storage locations on the disk consist of a region with non-overlapping tracks where random access writes can be performed, and a region with shingled written bands (page 6, paragraph 67). Additionally, Rosenblum shows that storage operations use a log structured approach (page 3, left hand column, lines 36-41 through right hand column, lines 1-2).

39. Regarding claim 25, the combination of Liu, Rosenblum, Holland, and Ono teaches all the limitations of claim 22 as shown above, and remapping sectors as required by an access to the disk (Ono, column 17, lines 34-44) wherein accessing the disk includes shingled track writing (Liu, page 6, left hand column, lines 35-45) and the RAID controller performs the logical to physical address translation for an access to a disk (Holland, column 4, lines 57-61).

Response to Arguments

Applicant's arguments filed 6/13/2007 have been fully considered but they are not persuasive.

Regarding applicant's argument against the rejection of claim 1 using the combination of Liu, Rosenblum, and Asano alleging that the combination does not show a cumulative ECC parity state between successive partial writes of an ECC block being retained, the examiner firstly notes that ECC check bytes do constitute parity information or a parity state as it is well known in the art that errors in recorded data can be detected with ECC check bytes that were generated for that data, wherein error detection is the function of parity. ECC check bytes serve the function of parity and the additional function of allowing certain detected errors to be corrected. Additionally, applicant notes that successive partial writes were shown in this office action and in the prior office action as it was noted in section 8 on pages 6 and 7 of this office action as well as in section 20 on pages 11 and 12 of the prior office action that writes are performed by sector and the ECC data block of Asano is comprised of more than one sector, thus requiring successive partial writes to fill an ECC data block of Asano. One of the passage cited from Asano (page 8, paragraphs 107 and 108) in this office action and in the prior office action shows that Asano teaches on-the-fly protection of data for a system using an ECC data block larger than one sector such that the ECC check bytes (parity) are stored and encoded separately for each sector written, creating a stored cumulative ECC parity state between each partial write to an ECC data block. The applicant's argument is not found to be persuasive.

Regarding applicant's arguments against the rejection of claim 10 over the combination of Liu, Rosenblum, and Ono alleging that the combination is not proper since Ono does not say the virtual address table taught by Ono is used by a log and

Rosenblum does not say that the log structure taught by Rosenblum is used in shingled writing, the examiner notes that the lack of an intended use in a reference corresponding to the intended use recited by the applicant is not enough to distinguish the claimed limitations of the instant application from the applied prior art. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. As motivation for combining the references was provided, the examiner does not find applicant's arguments against the rejection of claim 10 over the combination of Liu, Rosenblum, and Ono to be persuasive.

Similarly, the examiner finds applicant's argument against the rejection of claim 18 over the combination of Liu, Rosenblum, and Holland alleging that the combination is not proper since Rosenblum does not say that the log structure taught by Rosenblum is used in shingled writing to be unpersuasive since an intended use in a prior art reference that differs from the intended use recited by applicant for the claimed limitation does not prevent the prior art reference from being properly combinable with another reference in a 103 rejection of the claimed limitations of the instant application. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. As motivation for combining the references was provided, the examiner does not find applicant's argument against the

rejection of claim 18 over the combination of Liu, Rosenblum, and Holland to be persuasive.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tyler Willhite whose telephone number is 571-270-1175. The examiner can normally be reached on 7:30am - 5pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on 571-272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tyler Willhite
Examiner
Art Unit 2189

TW
June 29, 2007

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